REMARKS/ARGUMENTS

Favorable reconsideration and allowance of the present application are respectfully requested in view of the following remarks.

A. SUMMARY OF THIS AMENDMENT

By the current amendment, Applicants:

1. Amend claims 1, 6, 8 and 11.
2. Respectfully traverse all prior art rejections.

This is in response to the Office Action dated April 16, 2008. Claims 1-6, 8, 10 and 11 are pending. Claims 1-6, 8, 10 and 11 stand rejected in the outstanding Office Action. Claims 1, 6, 8 and 11 have been amended.

B. PATENTABILITY OF THE CLAIMS

The rejection of claim 11 under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement, is respectfully traversed. The Examiner stated that "The relation of the partial contact between the second conductivity type semiconductor layer and the front electrode is described as a "line" has not been disclosed in the applicant's specification". It is respectfully submitted that Fig. 5 and lines 7-9, p. 26 of the specification support the claim language questioned by the Examiner.

The rejection of claim 11 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite, is respectfully traversed. The Examiner stated that "it is unclear whether the line is a straight line, a curved line, lines adjacent to one another (lined up), or stacked". Claim 11 has been amended to include the word "straight" to overcome the rejection.

The rejection of claims 1and 6 under 35 U.S.C. § 103(a), as allegedly being unpatentable over Nakai (US 6,207,890) in view of Silva et al. (US 6,046,542), is respectfully traversed.

Regarding claim 1, the Examiner has identified Nakai's n-type semiconductor substrate 1 in Fig. 11 as the claimed first conductivity type semiconductor substrate having convex and concave portions, the p-type layer 3 as the claimed second conductivity type semiconductor layer "formed on the surface of the first conductivity type semiconductor substrate 1", and electrode 4 as the claimed front electrode connected to the second conductivity type semiconductor layer 3. The Examiner acknowledged that Nakai fails to disclose the second conductivity type semiconductor layer being partially in contact with the front electrode and becoming thinner as it goes farther from the contacted area. He then resorted to Silva for the missing limitations.

Silva discloses a thin-film electron emitter used in, for example, flat panel displays (col. 1, lines 6-13). The device (Fig. 1) comprises an anode plate 100 which is spaced in vacuum 105 from an electron emitter array 50. The anode plate has phosphor or other electroluminescent material 102 which is activated by electron emission from the electron emitter array 50 (col. 4, lines 49-61). The emitter array 50 comprises thin-film electron emitters 51 formed side-by-side in a semiconductor film 10. Each emitter 51 comprises an electron emission area in the form of plane area 11a on the front major surface 11 of the film 10. A front electrode 15 is located along the periphery of the plane emission area 11a (see Fig. 2) and conductive tracks 25 contact the electrodes 15 (col. 5, lines 3-12, col. 6, lines 1-8). Conductive trucks 25 also are along the periphery of the plane emission area 11a.

With the amendment to claim 1, it is made clear that the second conductivity type semiconductor layer is in <u>contact</u> with the first conductivity type semiconductor substrate (see, for example, layer 5 being in contact with substrate 4 in Fig. 1 of the specification). In contrast,

in the device of Nakai, layer 3, identified by the Examiner as the claimed second conductivity type layer, is not in contact with substrate 1, identified by the Examiner as the claimed first conductivity type substrate, since an intervening layer 2 is formed between substrate 1 and layer 3.

Moreover, the combination of Nakai and Silva is improper. First, the two references disclose two completely different devices. Whereas Nakai discloses a photovoltaic element (i.e., a device that converts an optical energy as solar light into electric energy), Silva discloses an thin-film electron emitter (i.e., an element that converts electric energy to optical energy in a flat panel display device). Furthermore, whereas the device in Nakai comprises a semiconductor substrate being completely covered with several layers of semiconductor material, e.g., 2 and 3, as well as being completely covered with electrode 4 (see Fig. 11), the electron-emitter element of Sylva comprises an array of open areas 11a, which comprise the electron-emission areas of the element (see Fig. 2). These open areas 11a do not correspond to the claimed partial openings in the second conductivity type layer that are in contact with the front electrode.

In addition, Silva fails to teach "the second conductivity type semiconductor layer being partially in contact with the front electrode and becoming thinner as it goes farther from the contacted area", as required by claim 1. The Examiner stated that "the tracks become thinner as [they go] away from the contact area". However, it is the second conductivity type layer that becomes thinner as it goes further from the contact area, not the electrode.

Regarding claim 6, with the amendment it is made clear that the front electrode is only in partial contact with the second conductivity type layer (see Fig. 6 in specification). It is respectfully submitted that the electrode 4 in Fig. 4 of Nakai is not in partial contact with the convex portion which constitutes a part of the semiconductor substrate.

Moreover, the Examiner claimed that Nakai teaches the claimed manufacturing method and cited col. 10, lines 34-61, which refers to Fig. 4. The above passage states that "an intrinsic amorphous silicon layer 2 and a p-type amorphous silicon layer 3 are deposited by a plasma CVD method". There is no teaching of the claimed forming of a barrier film and subsequent implantation of second conductivity type impurities into the semiconductor substrate, wherein the barrier film becomes thicker from the convex portion to the concave portion. No layer in Fig. 4 of Nakai is such that it becomes thicker from the convex portion to the concave portion.

The rejection of claim 8, as allegedly being anticipated under 35 U.S.C. § 102(b) by Nakai et al. (US 6,207,890) is respectfully traversed. Nakai fails to disclose or even remotely suggest each and every limitation set forth in the claims. Anticipation requires that "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference", *Verdegaal Bro. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987) (MPEP § 2131).

Similarly with the above discussion regarding claim 6, Nakai fails to teach the claimed formation of a film being thicker from the convex portion to the concave portion, or the partial contact between the front electrode and the concave portion.

For the above reasons, claims 1, 6 and 8 are allowable.

It is respectfully requested that the rejection of claims 2-5, 10 and 11, each being dependent from claim 1, also be withdrawn.

C. MISCELLANEOUS

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

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